

Title (en)  
Harmonic suppression mixer and tuner

Title (de)  
Mischer zum Unterdrücken von Oberwellen sowie Tuner

Title (fr)  
Mélangeur de suppression d'harmoniques et syntoniseur

Publication  
**EP 2136468 B1 20120613 (EN)**

Application  
**EP 09167662 A 20050311**

Priority  
• EP 05725330 A 20050311  
• US 55286404 P 20040312  
• US 63658404 P 20041216

Abstract (en)  
[origin: WO2005091493A1] A harmonic suppression mixer for down converting an RF signal to a complex I and Q baseband signal that uses a plurality of switching mixers each with a gain stage to produce a sinusoidal weighted sum of the mixer outputs. Odd harmonics output by each switching mixer is suppressed in the composite signal. A low skew local oscillator (LO) clock generator creates multiple LO phases and drives the mixers. The mixer can be used in low noise direct conversion RF tuners. The mixer is configurable by programming gain stage coefficient values to achieve a variable number of effective mixers used in combination. At low tuning frequencies, all available mixers are programmed with unique coefficients and driven by different LO clock phases to achieve maximum harmonic suppression. At high tuning frequencies, some mixers are paralleled and duplicate coefficients are programmed or mixers are disabled to reduce the number of effective mixers.

IPC 8 full level  
**H03D 7/14** (2006.01); **H03D 7/16** (2006.01); **H04B 1/10** (2006.01); **H04B 1/18** (2006.01); **H04B 1/26** (2006.01); **H04B 1/28** (2006.01)

CPC (source: EP US)  
**H03D 7/14** (2013.01 - EP US); **H03D 7/1433** (2013.01 - EP US); **H03D 7/1441** (2013.01 - EP US); **H03D 7/145** (2013.01 - EP US); **H03D 7/1483** (2013.01 - EP US); **H03D 7/165** (2013.01 - EP US); **H04B 1/28** (2013.01 - EP US); **H03D 2200/0025** (2013.01 - EP US); **H03D 2200/0033** (2013.01 - EP US); **H03D 2200/0086** (2013.01 - EP US); **H03D 2200/009** (2013.01 - EP US)

Cited by  
US8624660B2; US8907738B1

Designated contracting state (EPC)  
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU MC NL PL PT RO SE SI SK TR

DOCDB simple family (publication)  
**WO 2005091493 A1 20050929**; AT E439699 T1 20090815; DE 602005015942 D1 20090924; EP 1735905 A1 20061227; EP 1735905 B1 20090812; EP 2136468 A1 20091223; EP 2136468 B1 20120613; ES 2330761 T3 20091215; HK 1139521 A1 20100917; US 2005239430 A1 20051027; US 7519348 B2 20090414

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**US 2005008104 W 20050311**; AT 05725330 T 20050311; DE 602005015942 T 20050311; EP 05725330 A 20050311; EP 09167662 A 20050311; ES 05725330 T 20050311; HK 10106198 A 20100623; US 7805005 A 20050311